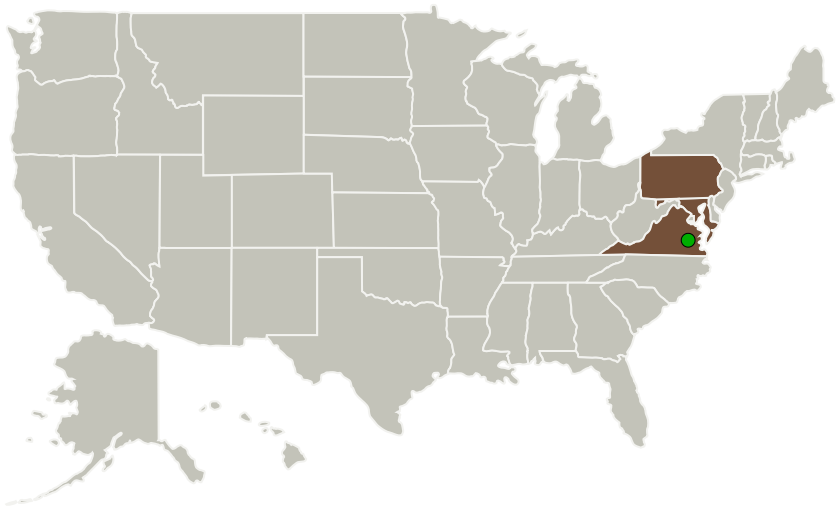
Alternative Green Technology for Power Generation Using Waste-Heat Energy And Advanced Thermoelectric Materials, Phase I

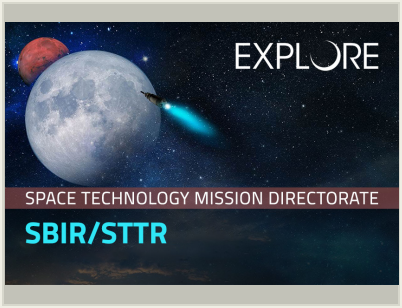
Completed Technology Project (2011 - 2012)

Project Introduction

NASA is interested in advancing green technology research for achieving sustainable and environmentally friendly energy sources for both terrestrial and space applications. It has been reported that thermo-electric power generation (TEPG) can contribute to electrical power generation scavenged from waste heat sources. Significant advantages to TE technology include: no moving parts, low-weight, modularity, covertness, high power density, low amortized cost, and long service life with no required maintenance. TEPG also has the potential of enabling large-scale electric power generation. We propose to continue are on-going research of PbTe single crystals and investigate the FAST technique, developed by Penn State Univ., to produce bulk nano-composites. We will assemble the material into TE devices and optimize the high temperature electrical contacts for minimal resistivity. We expect to standardize the processes to produce device with efficiency up to 10% (we currently have efficiency of 4.4%) by the end of Phase II. The major goal of the proposed work is to establish the feasibility that kilowatt levels of power can be produced in an environmentally clean (pollution free) manner using TEPG.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Brimrose Technology Corporation(BTC)	Lead Organization	Industry	Sparks, Maryland
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Maryland	Pennsylvania
Virginia	

Project Transitions

February 2011: Project Start

February 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140247)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Brimrose Technology Corporation (BTC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Sudhir B Trivedi

Co-Investigator:

Sudhir Trivedi

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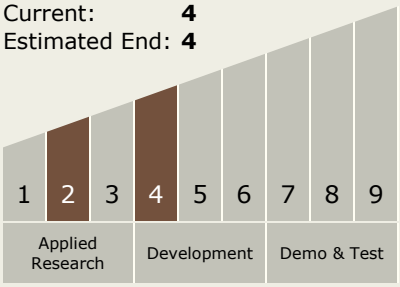
Completed Technology Project (2011 - 2012)

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System